



CERTIFICATION PROGRAM

Certified Irrigation Contractor Examination Equations

Basic and non-irrigation equations and conversions are assumed to be known by candidates. ICW refers to the Irrigation Association Irrigation Contractor Manual, December 2002 edition, updated August 2008. The equations are presented in the latest IA format and may appear different from those presented in the reference material.

1 cubic foot of water = 7.48 gallons

1 acre-inch = 27,154 gallons

1 acre-foot = 325,848 gallons

$FC_{\%} = \frac{WW - DW}{DW} \times 100$	ICW Eq. 2-1	$CU = 100 \times \left(1 - \frac{\text{Average Deviation}}{\text{Average Catch}} \right)$	ICW Eq. 3-1
$DU_{LQ} = \left(\frac{\text{Average Catch in Lower Quarter}}{\text{Average Catch Overall}} \right) \times 100$	ICW Eq. 3-2	$SC = \frac{\text{Average Catch Overall}}{\text{Average Catch in Critical Dry Area}}$	ICW Eq. 3-3
$PR = \frac{96.3 \times Q}{A}$ <p><u>Various A values</u> $A = S_1 \times S_2$ $A = 0.866 \times S^2$ $A = 0.8 \times D_t \times S$</p>	ICW Eq. 4-2 & p. 45	$PR_{net} = \frac{3.66 \times V_{avg}}{t_R \times A_{CD}}$	ICW Eq. 4-3
$RT = 60 \times \frac{IR_{gross}}{PR}$	ICW Eq. 5-1	$CRT = 60 \times \frac{\text{Basic intake rate}}{PR}$	ICW p. 52
$\text{Cycles} = \frac{\text{Run Time}}{\text{Cycle Run Time}}$	ICW Eq. 5-2	$IR_{gross} = \frac{IR_{net}}{E_a / 100}$	ICW p. 53
$V = \frac{0.408 \times Q}{ID^2}$	ICW Eq. 7-1 & 7-2	$F_f = P \times \left(\frac{\Delta p}{L_{100}} \right)$	ICW Eq. 7-3



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$F_f = \frac{\Delta p}{L_{100}}$	ICW Eq. 7-4	$H_f = 0.090194 \times \left(\frac{100}{C} \right)^{1.852} \times \frac{Q^{1.852}}{D^{4.866}}$	ICW Eq. 8-1
$Q = A \times V$	ICW Eq. 8-3	$P_s = \frac{0.07 \times (\text{Velocity}) \times (\text{length of straight pipe})}{(\text{valve closing time})}$	ICW Eq. 8-4
$p_t = p_s + p_o$	ICW Eq. 8-5	$H_v = \frac{V^2}{2 \times g}$	ICW Eq. 9.1
$NPSHA = H_a - H_s - H_f - H_{vp}$	ICW p. 135, discussion	$Bhp = \frac{Whp}{(E_p / 100)} \quad \text{or} \quad = \frac{Q \times H}{3960 \times \text{Eff}}$	ICW Eq. 9-2
$Whp = \frac{Q \times H}{3960}$	ICW Eq. 9-3	$V = I \times R$	ICW p. 202
$R_w = \frac{1000 \times (AVL)}{2 \times L \times I}$	ICW Eq. 11-1	$L = \frac{1000 \times AVL}{2 \times I \times R_w}$	ICW Eq. 11-2